K4051 Canceller Reference Board

Kumu Networks' K4051 2.4GHz Canceller board is a low-cost, low-power RF-canceller that can be used to suppress interference between two co-located radios in the 2.4GHz ISM band, typically between WiFi (2x2) and Bluetooth/BLE/Zigbee/Thread radios. The solution uses Kumu Networks' KU10405 tap chip that has 4 high linearity, programmable taps.

Features and Benefits

- RF Self-Interference Cancellation >25dB
- Passive cancellation with low power consumption <2mW
- Bi-directional Cancellation
- Full 2.4GHz ISM band support (2400MHz - 2480MHz)
- Dynamically adapting to changes in the reflection environment
- Front-end existing radios without need for radio modifications
- Supports 2Tx 2Rx MIMO WiFi and BLE/Bluetooth/ Thread/Zigbee SISO radio

Block Diagram

A functional diagram of the board is shown in *Figure-1*. Cancellation is bi-directional. The Canceller reduces WiFi transmitters' interference as seen by a Bluetooth receiver (*Figure 1*) as well as the other way around. As a result, WiFi performance can be maintained at the highest level, while using other radios in the band.

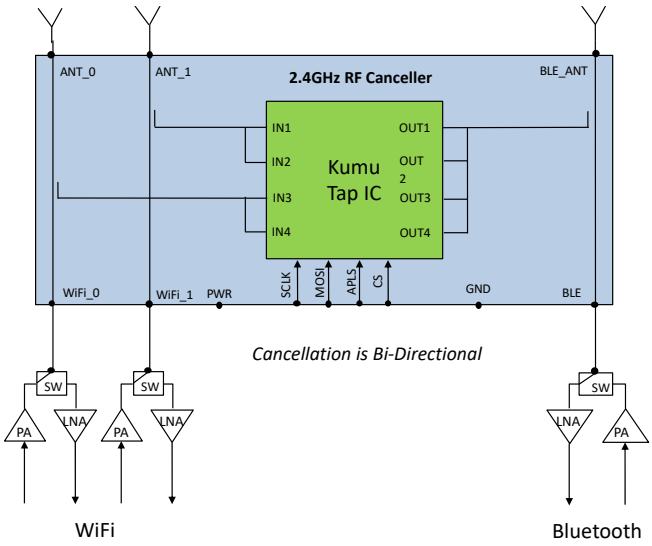

Figure 1: Functional Block Diagram

Form Factor

The size of the board is 27mm x 24mm (*Figure2*).

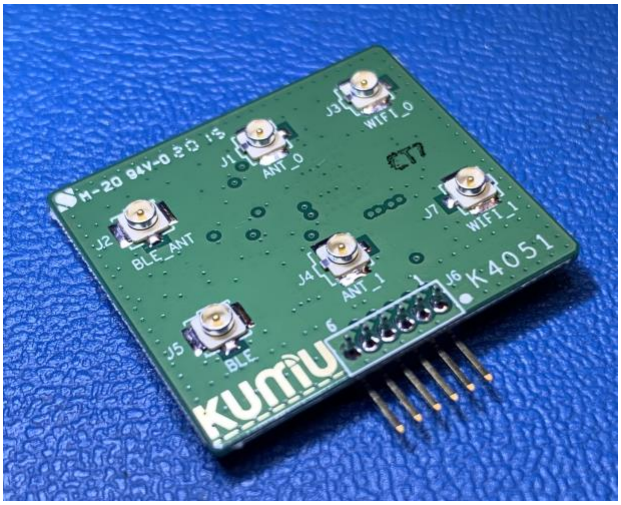

Figure 2: K4051 Canceller Board

Performance

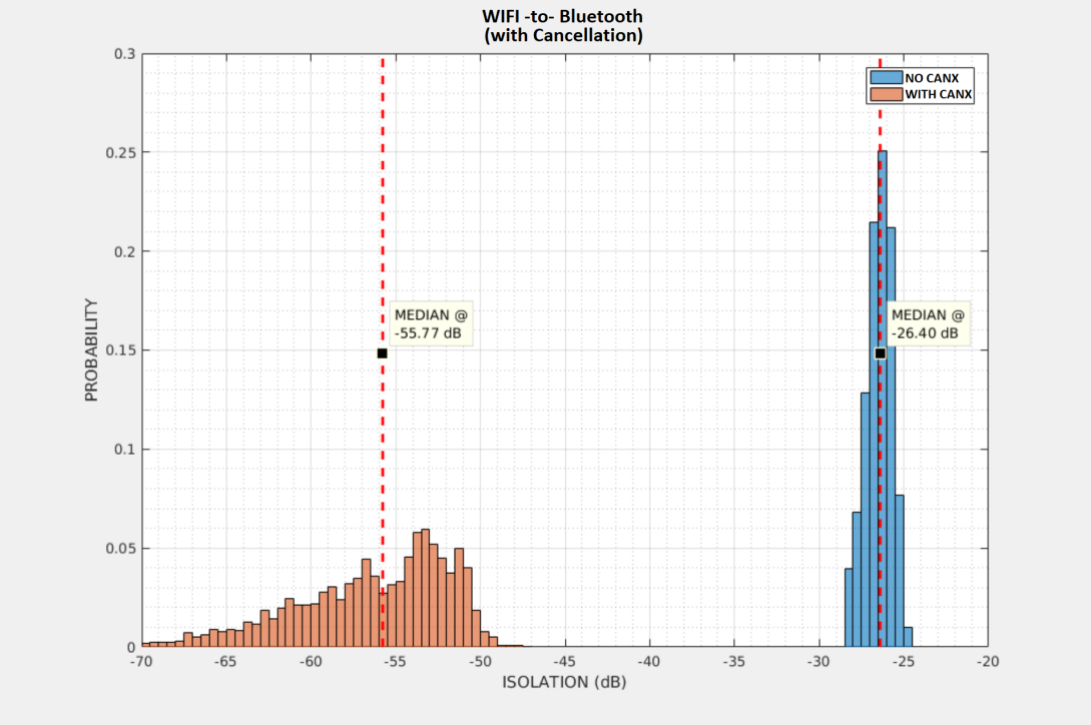

Figure 3: Typical Measurements of WiFi - Bluetooth isolation with (in Brown) and without (in Blue) Cancellation

Interfaces

Interface	Purpose	Input/Output	Connector
WiFi_0	RF I/O from WiFi transceiver	I/O	u.FL
WiFi_1	RF I/O from WiFi transceiver	I/O	u.FL
ANT_0	RF I/O to WiFi antenna	I/O	u.FL
ANT_1	RF I/O to WiFi antenna	I/O	u.FL
BLE	RF I/O from BLE* transceiver	I/O	u.FL
BLE_ANT	RF I/O to BLE* antenna	I/O	u.FL
PWR	2.7V – 5.5V	PWR	6-pin Header**[1]
SCLK	Serial Clock (1.8V – 3.6V)	Input	6-pin Header[2]
MOSI	Serial Data (1.8V – 3.6V)	Input	6-pin Header[3]
APLS	Apply Weights (on rising edge, 1.8V – 3.6V)	Input	6-pin Header[4]
CS	Chip Select (1.8V – 3.6V)	Input	6-pin Header[5]
GND	-	GND	6-pin Header[6]

*BLE/Bluetooth/ZigBee/Thread etc.

** Digital Connector: Harwin M50-3530642

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